Abstract of the Disclosure

A method of adding a new connection (c, d) to a time:space:time switch fabric. The fabric has a set I of k input elements, a set M of m switch elements, and a set O of l output elements. Each input element contributes one input to each switch element, and each output element receives one output from each switch element. A state S_m characterizes the switch elements as a set of ordered pairs (i, j), where $(i, j) \in S_m$ if and only if the j^{th} output element is coupled to the i^{th} input element through one of the switch elements. The range of S_m is the set of outputs of S_m such that if $j \in \text{range}(S_m)$ then $(i, j) \in S_m$ for some $i \in I$. The domain of S_m is the set of inputs of S_m such that if $i \in \text{domain}(S_m)$ then $(i, j) \in S_m$ for some $j \in O$. If a switch state S_m exists where $c \notin \text{domain}(S_m)$ and $d \notin \text{range}(S_m)$, then the new connection is added to S_m as (c, d). If no such state exists, and if no switch state S_m exists wherein $c \notin \text{domain}(S_m)$, then the method terminates because c is fully allocated. If there is a switch state S_m wherein $c \notin \text{domain}(S_m)$, and if no switch state S_n exists wherein $d \notin \text{range}(S_n)$, then the method terminates because d is fully allocated. If such a state S_n exists, the two states S_m, S_n are joined to form a union J with each element (i', j') in J labelled u if $(i', j') \in S_m$, and each element (i', j') in J labelled v if $(i', j') \in S_n$. The new connection is then added to J as (c, d). A label (u or v) is allocated to the new connection. If new connection's label has not previously been allocated to a connection $(i', d) \in J$ the method terminates. Otherwise, the opposite label (v or u) is reallocated to connection $(i', d) \in J$. If such opposite label has not previously been allocated to a connection $(i', j') \in J$ the method terminates. Otherwise, the originally selected label (u or v) is reallocated to connection $(i', j') \in J$ and the process repeats until no label conflicts remain. The originally selected label (u or v) is chosen to minimize the number of connections requiring reallocation of labels.